06120 USA

Claims for conflicting case

CLAIMS

What is claimed is:

1. An aqueous-based ethylene-vinyl acetate polymer emulsion suited for use in heat seal applications said ethylene-vinyl acetate polymer comprised of crystalline ethylene segments prepared by emulsion polymerizing ethylene and vinyl acetate in the presence of a stabilizing system consisting essentially of a surfactant or a cellulosic protective colloid in combination with a surfactant, said ethylene-vinyl acetate polymer having:

(a) a crystalline melting point ranging from 35 to 110 °C measured at a heat rate of 20 °C per minute; and,

(b) a tensile storage modulus of at least 1 x 10^5 dynes/cm^2 at a temperature of 115 °C and measured at 6.28 rad/sec.

2. The polymer emulsion of claim 1 wherein the polymer is comprised of from 15 to 90% by weight of polymerized units of vinyl acetate and from about 10 to 85% by weight of polymerized units of ethylene based upon the total weight of the polymer.

3. The polymer emulsion of claim 1 wherein the polymer is comprised of from 25 to 80% by weight of polymerized units of vinyl acetate and from about 20 to 75% by weight of polymerized units of ethylene based upon the total weight of the polymer.

4. The polymer emulsion of claim 1 wherein the polymer is comprised of from 35 to 75% by weight of polymerized units of vinyl acetate and from about 25 to 65% by weight of polymerized units of ethylene based upon the total weight of the polymer.

5. The polymer emulsion of claim 1 wherein the polymer is comprised of from 30 to 50% by weight of polymerized units of vinyl acetate and from about 50 to 70% by weight of polymerized units of ethylene based upon the total weight of the polymer

6. The polymer emulsion of claim 2 wherein polymerized carboxylic acid units are present in said polymer in an amount from about 0.2 to about 10% by weight of said polymer.

7. The polymer emulsion of claim 6 wherein said polymer has a tensile storage modulus of at least 2 x 10^5 dynes/cm^2 at 115 °C and measured at 6.28 rad/sec.

8. The polymer emulsion of claim 7 wherein the polymer is comprised of polymerized units of ethylene, vinyl acetate, and acrylic acid.

9. The polymer emulsion of claim 7 wherein the crystalline heat of fusion of said polymer is from about 5 to 100 joules per gram as measured at a heat rate of 20 °C per minute.

10. The polymer emulsion of claim 7 wherein the glass transition temperature is from +25 °C to about -35 °C as measured at a heat rate of 20 °C per minute.

11. The polymer emulsion of claim 8 wherein crystalline thermal melting point ranges from 50 to 90 °C as measured at a heat rate of 20 °C per minute.

12. The polymer emulsion of claim 8 wherein a portion of the emulsion polymerization is carried out at a pressure of from 1000 to 2000 psig (6,996 to 13,891 kPa).

13. The polymer emulsion of claim 12 wherein the stabilizing system consists essentially of hydroxyethyl cellulose in combination with a surfactant.

14. The polymer emulsion of claim 13 wherein the vinyl acetate is present in an amount from 15 to 90% by weight, the ethylene is present in an amount from 10 to 85% by weight, and the acrylic acid is present in an amount from 0.5 to 5% by weight of the polymer.

15. The polymer emulsion of claim 14 wherein the crystalline heat of fusion ranges from preferably 15 to 70 joules per gram as measured at a heat rate of 20 °C per minute.

16. A process for making an aqueous-based semi-crystalline ethylene vinyl acetate polymer emulsion which comprises reacting vinyl acetate and ethylene with optionally one or more other ethylenically unsaturated monomer, under emulsion polymerization conditions in the presence of a stabilizing system consisting essentially of a surfactant or a cellulosic protective colloid in combination with a surfactant, said ethylene-vinyl acetate polymer having:

(a) a crystalline melting point ranging from 35 to 110 °C measured at a heat rate of 20 °C per minute; and,

(b) a tensile storage modulus of at least 1 x 10^5 dynes/cm^2 at a temperature of 115 °C and measured at 6.28 rad/sec.

17. The process of claim 16 wherein the addition of monomers, except ethylene, to the emulsion polymerization are completed within the first 75% of the total reaction time.

18. The process of claim 16 wherein a portion of the process is carried out at pressures of from 1000 to 2000 psig (6,996 to 13,891 kPa).

19. A process for forming a paper stock for heat seal application which comprises:

coating a paper substrate with a polymer emulsion comprising emulsion polymerized units of vinyl acetate and ethylene with one or more other ethylenically unsaturated monomer, wherein said polymer emulsion is stabilized with a stabilizing system consisting essentially of a surfactant or a cellulosic protective colloid in combination with a surfactant, said polymer containing crystalline ethylene segments and having (a) a crystalline melting point ranging from 35 to 110 °C as measured at a heat rate of 20 °C per minute; and, (b) a tensile storage modulus of at least 1 x 10^5 dynes/cm^2 at a temperature of 115 °C and measured at 6.28 rad/sec; and then,

drying the coating, said dried coating being non-blocking at ambient temperature.

20. A multi-layer heat sealable material comprising

(a) at least one substrate; and

(b) at least one coating of a polymer emulsion comprising emulsion polymerized units of vinyl acetate and ethylene with one or more other ethylenically unsaturated monomer, wherein said polymer emulsion is stabilized with a stabilizing system consisting essentially of surfactant or a cellulosic protective colloid in combination with surfactant, said polymer containing crystalline ethylene segments and having (a) a crystalline melting point ranging from 35 to 110 °C measured at a heat rate of 20 °C per minute; and, (b) a tensile storage modulus of at least 1 x 10^5 dynes/cm^2 at a temperature of 115 °C and measured at 6.28 rad/sec.